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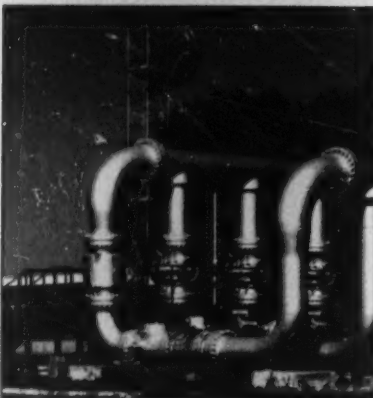
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Cover Photograph by
Peter Angelo Simon

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Editorial

Time for a Second Move

It was almost two years ago when we first requested an interview on Soviet soil with the dp chief of the USSR. It was little more than two months ago that our interview was approved. When international editor Paul Tate arrived in Moscow on Jan. 19, it was during the Soviets' coldest winter of the century.

But his reception was warm. He left London hoping to get a reasonable answer to his toughest question: how do you introduce mass computerization into a closed society? He returned with an answer: the Soviet Union is not as closed as it once was. That's a start. What's more, he met with a man who seems more scientist than politician.

It's easier to oppose an ideology than it is to oppose a person.

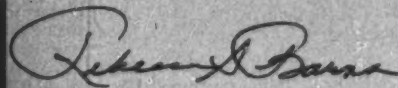
The granting of our interview can only be seen as one more step in a series signaling the start of openness in Soviet society. Soviet leader Mikhail S. Gorbachev's latest moves toward a greater "democratization" are long overdue. For the once-censored "Doctor Zhivago" to be serialized by the Soviets next year somehow makes more sense than ABC's recent airing of the mini-series "Amerika."

We applaud the Soviets' respect for DATAMATION. Their government made it clear that it expected no less than fair and equitable treatment of its views on East-West trade in computers. Fair and equitable is our story, "Opening Moves" (p. 43).

But in the interest of fairness, we must now make a "second move" as a magazine. We must state our position on the eastward flow of technology. Our original question has grown: now we ask, can computers help open a closed society? Our answer is, yes; let's sell the Soviets personal computers. The use of pcs serves to accelerate an open society. They foster individual freedoms, not government control. We can help speed the democratization of the East without mortgaging the future of the West.

But trade beyond pcs is a subject for debate by those well versed in computers as well as national security. Computers, after all, are at the core of every government's defense strategy.

And Boris Nikolaevich Naumov, after all, is only part scientist. ■



REBECCA S. BARNA
EDITOR

Storage quantities once limited to mainframe environments are now common for micros and supermicros. Optical storage makes new market opportunities for vars and oems. But magnetic media, particularly Winchester technology, still boast the money-making characteristics of speed, reliability, updatability, and price; floppy disks and tape drives will feel the brunt of the optical attack.

Mass Storage Opportunities

BY ANNE A. ARMSTRONG

There's a small boom in market research: reports abound on the mass storage market. Without exception, researchers agree on two things: that users have what seems to be an insatiable appetite for memory; and that the costs of providing this memory are going down dramatically.

Disk/Trend Inc. of Los Altos, Calif., has recently completed its analysis of the rigid disk drive market and concludes that worldwide revenues reached \$15 billion in 1986. The biggest growth area in fixed drives is expected to be in the 30-megabyte to 100-megabyte range.

Worldwide shipments of these drives is forecast to hit 1,793,500 by the end of 1986, an increase of more than 115%. Nearly 95% are 5¼-inch drives. In the next five years, Disk/Trend expects 3½-inch drives to take over the low-capacity market (less than 30MB) and to capture more than 90% of the total.

Electronic Trend Publications of Cupertino, Calif., released a lengthy study in 1985 on the impact of optical

memory on magnetic storage. Among its conclusions are that growth in the optical disk drive market will double each year for the next three years.

Although all types of magnetic storage will feel the impact of optical memory systems, according to ETP, Winchester disk storage will be the least affected (see Figure 1). The greatest impact will be on the market share held by floppy disk drives and tape drives, says Jonah

McLeod, author of the report.

Santa Barbara, Calif.-based Freeman Associates, which also analyzes the optical disk market, sees read-only drives selling the most units, but more expensive write-once drives pulling in the biggest percentage of revenue. Erasable optical drives are expected to edge into the market at the end of 1987 and to grow to represent worldwide sales of more than \$347 million by 1991.

What all these numbers and predictions mean for vars is a continued healthy growth in memory sales and at least some erosion of magnetic media sales to optical technology.

The dramatically falling cost of all kinds of storage has presented a host of new options for resellers and users alike. Storage quantities once available only in mainframe environments are now becoming common in the micro and supermicro environments.

Another market research firm, Info-Corp., also of Cupertino, says standard hard disk configurations in personal computers increased to 20MB in 1986 from 10MB in 1984, and are expected to grow to 40MB by 1988. John Gale of the Information Workstation Group in Alexandria, Va., says current user demands require at least 20MB of hard disk storage and AT performance. "The 10MB disk is passé," he comments. "You can't do anything with it."

But the industry is already exceeding these expectations. Priam's systems division has just announced that it has signed an agreement with Entré Computer stores to sell two of its hard disk systems for the IBM aftermarket. The sizes of the drives are 60MB and 62MB. A Priam Corp. representative says the San Jose company believes that the market is already demanding more than a 20MB or

**"NOT REALLY
SOLD ON
OPTICAL
STORAGE."**

30MB capacity. Several analysts agree that the market may skip 40MB and move quickly to a 60MB standard hard disk configuration.

Two factors have been driving the storage market—the declining cost per megabyte of memory and the growing demand for storage made by applications programs, such as electronic publishing systems and CAD/CAM.

David Vellante, storage products program manager at International Data Corp. in Framingham, Mass., says that vars need to go beyond the storage supplied by the computer vendor for two reasons: target applications frequently require faster, higher capacity drives; and profits can be enhanced by dealing directly with drive manufacturers.

Reviewing var activity throughout the country, Vellante sees four "hot" mass storage application areas that are currently fueling much var interest—CAD/CAM, communications networks, electronic publishing, and database-intensive applications.

Selection Depends on Application

Selecting a particular type of storage depends, of course, on the specific application. Vars tend to offer custom arrangements, not cookie-cutter conformity. A look at the choices some vars and systems integrators are making, however, may offer some useful information to other vars facing similar decisions.

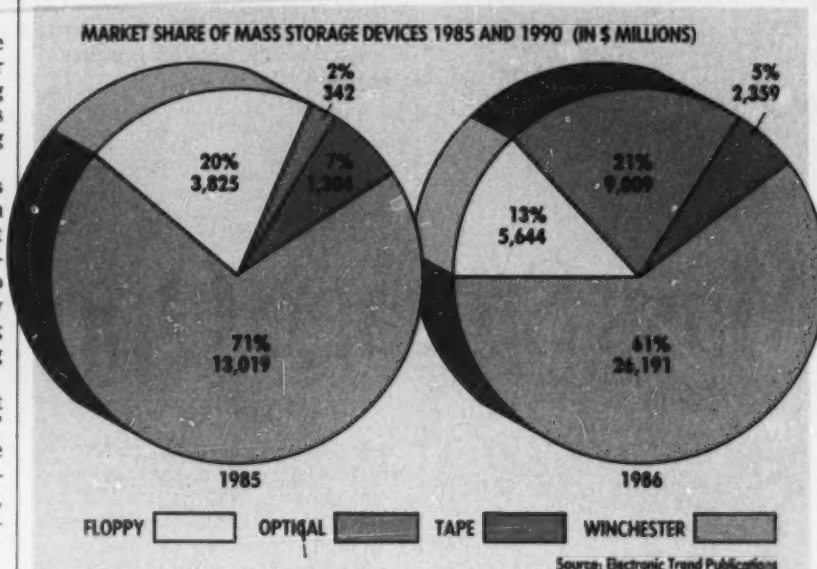
Fixed disk drives, particularly Winchester, remain the choice of a number of the vars DATAMATION talked to. The most frequently mentioned advantages were speed, reliability, updatability, and price. Rich Pounds, vp of DataChange

**"CUSTOMERS
JUST WANT
SOLUTIONS."**

Inc., a software developer and var in Norcross, Ga., says, "We're not really sold on optical storage. Right now, I don't see any major applications. Access times are too slow, and in many cases, there is no full-text search capability. You have to know what you're looking for before you can locate it on the disk."

Pounds says most customers with database-intensive applications can get

FIGURE 1 Optical Memory Impact on Magnetic Storage



two large-capacity Priam hard disk drives for \$28,000 and run a 16-terminal pc system off of it for less than the cost of a large optical system. "You can reindex and update everyday on a system like that," he says. According to Pounds, the acronym WORM doesn't stand for "write once, read many times"; he believes it can mean "write once, read maybe."

Cambridge, Mass.-based Interleaf Inc., which designs and markets turnkey systems and software for computer aided publishing applications, also selected Winchester technology for storing the systems programs that scan, edit, and manipulate text and images. The basic Interleaf workstation includes a Sun, Apollo, DEC, or IBM workstation and 86MB of hard disk storage, tape backup, and a laser printer.

In desktop publishing and CAD/CAM applications, 86MB is evolving as the minimum storage standard for more complex systems, according to International Data Corp.'s Vellante. Even with the 80-plus megabytes in Interleaf's system, says a company executive, the program contains so much code that only 20MB of the hard disk are free for user data storage.

When access time is critical—as it is in real-time image processing, for a file server on a busy network, or in an automatic equipment testing environment—vars may want to consider specially designed, high-end Winchester drives,

such as Chatsworth, Calif.-headquartered Alpha Data's Atlas series of hard disk drives.

All Atlas drives use multiple heads. In the case of the 520MB model, 76 heads move over four disk platters at access times the company says are less than 18msec. Other models offer 128MB and 160MB configurations with 54 heads. At an oem price of \$6,000 to \$9,000 a drive, the Atlas is targeted at high-end office applications, local area networks, and CAD/CAM workstations.

Reliability is mentioned often as a reason to stick with magnetic media. Customers are comfortable with the technology. With the growing sizes, capacities, and capabilities of Winchester, the fixed disk drives are evolving to fit new situations and are not being pushed aside by newer technologies.

Optical technology is used for a number of storage products that have little in common except that a laser is used to encode and read the data. Write-once drives in both 12-inch and 5¼-inch sizes have been aimed primarily at the archival market.

A typical configuration is as part of a document filing system that a bank or an insurance company would use to permanently record medical records, bills, receipts, or other transactions. In this application, the nonerasability of the optical disk is considered an advantage. The disk material is nonvolatile—lasting at

least 10 years, instead of two or three—and it cannot be erased by accident.

Biggest Drawbacks

The biggest drawback of the large write-once disks has been a lack of standards and high prices. For a document filing system with a jukebox of 12-inch drives, each holding one gigabyte on a side, the retail price can range from \$300,000 to nearly \$500,000.

The advent of 5¼-inch write-once drives in production quantities means that vars can now consider small optical drives as components in systems they configure.

TAB Products Co. of Palo Alto, better known for its office supply division, has included optical drives in two document filing systems. The 12-inch Series 2500 includes a scanner, Hitachi 12-inch write-once drive, Hitachi jukebox, high-resolution screen, and laser printer. Priced between \$60,000 and \$100,000 depending on the size of the jukebox, the system is still beyond most reseller markets.

TAB is also showing a smaller system, called the Series 1000, based on Optotech's 5¼-inch write-once drive. The system uses a small scanner, an AT, a small-form optical drive, and a laser printer. The system, complete with data-

base software, retails for \$49,900.

Colorado Springs-based Optotech's drive and controller are expected to sell as a separate package for \$4,500 in oem quantities. Connected to an AT, the drive offers 200MB of storage in a size and shape that will fit into a desktop system.

LaserData Inc. of Lowell, Mass., is now marketing an electronic filing and publishing system that includes both a small write-once drive and a compact disk read-only memory. The scanned documents are stored on the WORM drive, and if the data require wide distribution, they can be transferred to CD-ROM format and replicated. With scanner, IBM PC, software, and laser printer, the system sells for \$39,000.

Erasable optical technology interests many resellers, but the technology has not made it out of the lab. Some working prototypes have been shown in public by Hitachi and others, but industry analysts do not expect the drives to have much impact on the market before 1989 or 1990.

CD-ROM is, of course, an optical technology, but because it is read-only, it has special applications as a publishing or reference tool. Its appeal to the reseller market is that it can be configured inexpensively as part of a larger system. It

holds 550MB of digital data—sound, images, or text. Where networking is not a possibility—widely distributed locations, for example—and the data are reasonably stable, CD-ROMs will store volumes of reference material that can be inexpensively accessed.

Vertical Markets Early Choice

Vertical markets have been an early choice for many CD-ROM products. High-end financial information products have either been introduced or announced by Massachusetts companies Datest Inc. of Woburn and Lotus Development Corp. of Cambridge, and by Disclosure Inc. of Bethesda, Md. Subscriptions to such databases on CD-ROM run from \$4,000 to nearly \$29,000. Medical, legal, and engineering products are either in process or already on the market.

In many cases, the systems are being sold by the information provider as a way to find a new customer or regain control over product that was lost in an on-line environment. But there are still opportunities for vars with knowledge of the information needs of a specific vertical segment to put together a product and distribute it on CD-ROM disk.

Quadram Corp., Norcross, Ga., is developing a system called Quadvision that will allow companies to build image databases and prepare catalogs of text, pictures, stills, or videos. The Quadram system draws on software that has grown out of the interactive videodisk market and is now applied to a system that contains CD-ROMs, videodisks, IBM PC clones, and laser printers.

In these vertical markets, the collection of data is frequently considered valuable enough to justify the cost of the hardware. A PC clone, laser printer, CD-ROM drive, and required search and imaging software from a company such as Reference Technology are now priced at \$10,000. Corporate or in-house uses are expected to increase, particularly where the search capability of the disk cuts time lost looking for a part or a "cite" from a manual.

Whatever storage technology is selected, the var must balance the demands of the application against the capability of the system and choose the most cost-effective answer.

"By and large," says DataChange's Rich Pounds, "customers don't care about technology. They just want solutions."

Anne A. Armstrong is a freelance writer based in Arlington, Va.



"Okay, so, like, if I got this, ya know, receptionist job, would I, like, be expected to, ya know, like, speak English?"

A new survey of programmers and analysts finds that most of them like their jobs, primarily because of the kind of work they are asked to do. Most even like the salaries they are paid. Programmers and analysts who work for dp companies feel their work is appreciated, but outside the field, many think management is hostile, seeing dp as a cost, not a resource.

What You Should Know About Programmers

BY MARJORIE FREEDLAND

Just who *are* the men and women you've trusted to write critically important systems and applications for your company? What do systems analysts and programmers think about their work? What do they think of their bosses? Why do they quit? Are programmers and analysts optimistic about advancement within their firms? About the job market outside?

To find out, DATAMATION and Deutsch, Shea & Evans, a human resources research and advertising firm, conducted a dp career survey. In September 1986, 5,000 names were selected from DATAMATION's national circulation list. The survey targeted systems analysts, programmers, and their immediate managers: supervisors of analysis; senior systems analysts; chief, lead, and senior programmers. Thirty-five percent, or 1,751, responded. The proportion was 70% staffers, 30% supervisors.

The current survey updates and extends a profile of the dp professional that began when DSE surveyed DATAMATION readers in 1978. Wherever applicable, we compared today's findings with those reported eight years ago.

First things first: why did these people opt for their jobs? Multiple answers were permitted, so the total does not equal 100%.

It is encouraging that most took their jobs because they expected to like the work: 42% of the sample say they find their jobs creative, exciting, and

above all, professionally challenging. They write about "hot new projects," as well as diversity, i.e., "always something new." They enjoy their autonomy and freedom from supervision, and the scope of their responsibilities—"All dp problems go through me." The nature of the work is more important today than in 1978's survey, when 35% reported it was the reason they had chosen their jobs.

The next biggest factor was salary and benefits, which 36% of the 1986 sample cite as most important, down from 39% in 1978. Significantly, there is noticeably less concern with salary among young, entry-level people, who admitted they just needed a job, and among senior people—55 years or older, or with their company at least 15 years.

Opportunity for advancement was the deciding factor for 28% of the sample, somewhat more so among the younger participants.

Potential for training and education (8%) was more important to the younger and less experienced. Job stability had limited impact (6%), as did the relation of their new position to prior experience or background (2%).

Job location was a key point for 23% of the sample, but the oldest, most tenured, and least experienced are considerably more flexible. Working conditions and environment—things such as flextime—were of top importance for 10%.

Company's Culture, Style Important

For 8%, it was the image of the organization itself—its reputation, corporate culture, management style, and stability—that drew them to their company. Private-sector employers, particularly the Fortune 1000, are highly regarded. Another 3% commended the size and

**"ALL DP
PROBLEMS GO
THROUGH
ME."**

What You Should Know About Programmers

FIGURE 1 Why They Left

NEGATIVE FACTORS ABOUT PRIOR DP POSITION

CAREER FACTORS	%
Lack of advancement	18
Poor compensation	15
No job security	2
Lack of training/education	1
THE EMPLOYER	
Poor management, organizational politics	9
Restructured, out of business	6
Poor attitude	3
Relocated	2
THE WORK	
Unchallenging, uninteresting	10
Location/relocation	8
Working conditions/environment	8
Outdated equipment, systems	3
Laid off	2
Other	5
None/did not comment	6
No prior dp employer	30

*Total exceeds 100%, due to multiple response.
Base: Total number of respondents 1,751 = 100%

FIGURE 2 What's Good

MOST SATISFYING ASPECT OF PRESENT POSITION

THE WORK	%
Challenging, autonomous, diversified, scope of responsibilities	67
CAREER FACTORS	
Compensation	5
Training/education	4
Job security	2
Advancement opportunities	1
Client/user contact	8
Working conditions/environment	7
Equipment/systems	6
Caliber of coworkers	5
Management recognition, attitude/support	2
Other	1
Nothing/did not comment	9

*Total exceeds 100%, due to multiple response.
Base: Total number of respondents 1,751 = 100%

scope of the dp operation.

Seven percent wanted to work with equipment, systems, and methods on the "leading edge of technology."

Six percent report that this was their only offer. One confides, "Unemployment doesn't pay very well." In some cases, lack of experience or advanced age present problems: "Entry-level positions are difficult to find," writes one, and an "over 45" writes, "No other employer would consider my application."

Since 70% of the respondents have had at least one other dp job, why did they leave it? As Figure 1 shows, they were frustrated in their careers (36%), disenchanted with their employers (20%), bored with their work (10%), unhappy with the location (8%), working conditions (8%), and equipment and systems (3%). In essence, a replay of the scenario in 1978.

Dissatisfaction with previous employers is intense; it focuses on management, which movers variously describe as ignorant, inept, obnoxious, even tyrannical. Bad enough if bosses were "wishy-washy," worse if they were "half-ass management always yelling and

screaming, never doing any long-term building." Job movers deplored the bureaucratic and political atmosphere—in corporations as well as government agencies—that fosters the "buddy systems of promotions."

Long hours, having to work week-ends, and hectic schedules inspired defections. Dress codes and specified times for coffee breaks and lunch hours also sent programmers looking for the exits. Some left because they were tired of working with obsolete equipment or technology.

People seem happier with their present jobs. As Figure 2 indicates, two thirds (67%) report—as they had anticipated—it's the work itself that most turns them on. This percentage is virtually unchanged from 1978.

What's the flip side of the coin? What bugs them most about their current jobs?

Management Problems Bug Them

The main source of dissatisfaction centers, as in the 1978 survey, on management and organizational problems. Politics and bureaucracy are specifically reported by 27% (see Figure 3). Those who changed their job because of management may not have improved their situation in this regard.

Disenchantment with the organization focuses on "power politics" played in both large corporations and government agencies. Younger respondents, less familiar with the workings of mammoth hierarchies, complain about this more often than older professionals.

Career factors are most unsatisfying for 22%. Leading the list is lack of advancement, in their words, "nowhere to go," "no future," "no definite career path," and "a lack of mobility—horizontal or vertical." Those dissatisfied with compensation resent not being paid for overtime, not receiving bonuses, and management's failure to relate salary to performance and/or increased responsibilities. Others don't like the "hit or miss" quality of training.

The work, which so many find exciting and stimulating, is boring to 16%, particularly the older survey participants. They hate "paper-pushing projects," the "drudgery of documentation" and maintenance—and the lack of challenge.

Their working conditions come in for criticism as well. They heartily dislike the high level of job stress to which they are submitted: long hours, understaffing, poor physical layout, in short, "high-pressure, high-tension, Theory X envi-

FIGURE 3 What's Bad

LEAST SATISFYING ASPECT OF PRESENT POSITION

MANAGEMENT	%
	15
THE ORGANIZATION	
Bureaucratic, political, too large	12
CAREER FACTORS	
Lack of advancement	11
Compensation	8
Lack of training/education	3
THE WORK	
Unchallenging, unsatisfying, paperwork, documentation	16
Working conditions/environment, understaffing	12
Lack of recognition	5
Outdated equipment, systems	5
Caliber of coworkers/users	4
Budget limitations	2
Limited authority	1
Location	1
Nothing/did not comment	17

*Total exceeds 100%, due to multiple response.
Base: Total number of respondents 1,751 = 100%

What You Should Know About Programmers

ronment." Working on outdated equipment and systems is a further source of discontent, e.g., "being 'closet-cased' on dinosaur applications."

"Working With Morons"

The caliber of people they work with and those they work for causes additional dissatisfaction. They express it as: "working with morons," "unreasonable users, underachieving subordinates," "immature trainees," "political hirings of incompetent people."

How are they doing financially? According to survey results, the employee doing best is a male dp manager, at least 40 years old, with an advanced degree, 20 or more years in the field, and similar tenure with his employer—a Fortune 1000 computer/dp manufacturer with a very large dp staff, located in a major metropolitan area on either coast.

Figure 4 gives salary ranges and medians, overall and by sex and age. It shows that men are paid more than women and, as would be expected, older respondents earn more than younger ones. But there doesn't seem to be much difference in the earnings of dp staffers with associate's certificates and those who do not report any degree.

Managers are better compensated than those with staff functions—no surprise—but systems/software designers are paid nearly as well. Among the other functions, applications programming is the least financially rewarding.

What kinds of employers offer the most compensation? Employees of corporations in which data processing is the *raison d'être* average between \$40,000 and \$44,999. Next best paid are respondents in utilities, followed by government workers. People who earn the least are those who work in academia. Fortune 1000 salaries average nearly \$5,000 more than those paid by other organizations (\$42,000 as compared with \$37,100). As a rule, the larger the data processing department, the higher the compensation.

There is also some variation in salary by location. The highest median is reported in the Mid-Atlantic states, \$40,500, followed by \$40,000 in the West and \$39,900 in the Southeast. Below the average for the overall sample (\$39,000) are salaries in the Southwest, \$38,700; in New England, \$37,800; and in the Midwest, \$36,500.

Generally, programmers and analysts seem content with their salaries, although few mention compensation as the most satisfying part of their work.

Who They Are

There are more women in this year's sample, 18% compared with just 13% in the 1978 study, and the current participants are a bit older. The median age for men is 39. For women it is 38, suggesting that their entry into the field is more recent. Eight years ago the average age for both sexes was in the 25- to 34-year range.

As before, 95% are college educated, 57% with undergraduate experience, 38% having taken graduate courses. There is virtually no change in the degrees they hold: 8% associate's, 46% bachelor's, 25% master's, and 2% doctorates. In both surveys, 19% of the sample did not have college degrees. Not all majored in dp, computer science, or math. Many majored in business administration, engineering and science, social sciences, liberal arts, or education, with wide-ranging academic specialties, such as Far East studies, Spanish linguistics, anthropology, and religion.

In spite of their impressive academic credentials and access to formal training programs, half of them say they got their best training on the job and through self-teaching. Employer and vendor training programs were other sources of training.

By primary job function, systems analysis/programming dominates the sample: 17% in systems analysis, 29% in systems analysis/programming. Another 19% describe themselves as programmers—12% applications, 7% operating systems. Management positions are held by 17%. Of the rest, 9% are in systems and software design, 3% in database administration, and 9% in other functions, including quality assurance, security, consulting, and technical, operating, and marketing support. The 1978 sample was slanted more toward programming (43%). Systems analysis/programming comprised 35%, management 14%, systems design 21%, other functions 3%. (Multiple disciplines were reported in both samples.)

While the 1986 sample population is experienced and occupationally mobile, there is less job movement than eight years ago. The term "job hoppers" does not apply here: 61% have been in dp for 10 years or more, and 40% have remained with their present employer 10 years or more. The current group is slightly more experienced than 1978's, in which just 51% had 10 years in the field, 30% having spent 10 or more years with the same employer. In both samples, 81% had been in the field six or more years, but more stay with the same employer now than did then.

Furthermore, 30% of the sample are working for their first employer. Another 44% have had just one or two others. Only 13% have had three dp employers, 6% report four, 7% report five, and less than 1% report six or more prior dp employers. The pattern was essentially the same in the 1978 survey, but because the typical current respondent has been in the field longer, the pattern is further evidence of a trend toward staying put.

Their employers are in both the public and private sectors: 25% of the respondents work for agencies of the federal, state, or local government; 24% in non-dp manufacturing or processing facilities; 17% for computer/dp manufacturing, services, or consulting organizations; 13% in business or financial firms; 7% in academia; 5% in utilities; and 9% in other establishments such as research and development, transportation services, health care/medical, wholesale/retail trade, etc. Moreover, 38% are employees of Fortune 1000 companies.

Responses came in from all over the U.S. The Southeast, Midwest, and Northeast each checked in with about 23% of responses; about 10% came from the Southwest; and about 20% from the Mountain and Western states. Approximately half the sample work in nine major metro areas: 16% in New York, 10% in Washington, D.C., 5% in the combined Bay Area (San Francisco, Oakland, and San Jose), 5% each in Los Angeles and Chicago, 3% each in Houston and Boston, and 2% each in Detroit and Minneapolis/St. Paul.

Except for some minor deviations, the characteristics of the 1978 and 1986 samples are comparable.

Eighty-three percent describe themselves as satisfied, 25% highly so, 58% moderately. Only 16% are dissatisfied—14% somewhat, 2% very. These percentages are virtually the same as were reported in 1978.

By geographic region, satisfaction

with earnings relates, in general, to salary level, but there is one exception: respondents in the Midwest are apparently as happy with their lower salaries (84%) as their more highly compensated peers in the Mid-Atlantic (83%), Southeast (83%), and Western (86%) regions.

FIGURE 4 Salary by Sex and Age Group

SALARY RANGE	SEX			AGE GROUP								
	TOTAL (1,751) 100%	MALE (1,420) 81%	FEMALE (315) 18%	UNDER								
				25 (35) 2%	25-29 (218) 13%	30-34 (311) 18%	35-39 (359) 21%	40-44 (322) 18%	45-49 (236) 13%	50-54 (144) 8%	55-59 (93) 5%	60 OR OVER (28) 2%
<i>No. of respondents in sex or age group = 100%</i>	%	%	%	%	%	%	%	%	%	%	%	%
<i>Under \$25,000</i>	8	6	17	40	21	10	6	3	3	4	2	0
<i>\$25,000 - 29,999</i>	10	9	15	28	23	14	10	5	5	3	3	7
<i>\$30,000 - 34,999</i>	17	16	22	20	30	23	17	14	10	6	5	14
<i>\$35,000 - 39,999</i>	18	18	19	3	15	21	24	18	13	15	21	14
<i>\$40,000 - 44,999</i>	19	21	13	—	5	15	20	26	23	28	27	29
<i>\$45,000 - 49,999</i>	12	13	6	—	2	10	12	12	21	14	16	7
<i>\$50,000 - 54,999</i>	8	8	5	3	*	4	5	10	12	14	13	11
<i>\$55,000 or more</i>	7	8	*	3	*	2	6	10	12	15	12	18
<i>No answer</i>	1	1	2	3	2	1	*	2	1	1	1	0
<i>Median salary (in \$ thousands)</i>	\$39.0	\$40.2	\$33.9	\$26.5	\$30.8	\$35.4	\$38.4	\$41.9	\$44.0	\$43.9	\$43.4	\$42.5

*Less than 1%

Note: The few respondents who did not specify sex or age group are excluded from the sex and age analyses.

How do they rate their chances for advancement? A slim majority, 54%, are satisfied, but 45% are not. The 12% who are "highly" satisfied are offset by 12% who are "very" dissatisfied. This ambivalence is not surprising in view of the lackluster hopes for advancement we've already noted. It represents a more negative viewpoint than was reported eight years ago. Then, 60% were optimistic about advancement opportunities, and only 40% were not.

Older Respondents Gloomy

The "under-35s," who may not have experienced competition for a higher-level job as yet, are somewhat positive. Older respondents, aged 50 or more, are decidedly gloomy.

Particularly frustrated is the 50-to-54 age group, still hoping for upper-echelon positions. For the most part, the longer a programmer has been with his or her present employer, the less satisfied, but discontent does lessen for those over 54; perhaps diminished expectations lead to less discontent with the status quo.

Prospects for promotion appear brighter in the Fortune 1000 companies (60%) than in other organizations (51%). As might be expected, the larger the dp department, the more satisfied programmers and analysts are likely to be with advancement opportunities, since more openings are potentially available.

But suppose a programmer is angling for a new job. What does it look like on the street? How do programmers and analysts see the job market at their own experience levels compared with five years ago? Are more or fewer opportuni-

"Management Has No Earthly Idea . . ."

The programmer's perception of how management views the dp function was another facet of the management/dp relationship the survey investigated. Participants were asked, "Do you think management adequately appreciates the contribution the computer/dp department makes to your organization's overall operation? Why do you [don't you] think so?"

A bare majority, 52%, feel appreciated and answer yes, 36% say no, 11% don't know, and 1% didn't reply. This shows no significant change from the previous survey. It is no surprise that in the large dp departments of computer/dp manufacturing or business and finance firms, there is widespread feeling that management is appreciative. People in non-dp manufacturing/processing or utilities, however, hold the opposite view.

The 30-to-44 age group feels relatively unappreciated by management, since the promotions they strive for are evidently not forthcoming.

The yes responses: they know they're appreciated because management tells them so. "Praise from above flows bountifully," says one respondent. Others report "numerous accolades from management," "positive feedback," and "always getting compliments." They bask in the recognition and respect: "My input is sought after, my suggestions implemented."

Those who work in dp-intensive organizations say that their employers couldn't do without their work. "They have to appreciate dp. Otherwise, they would have nothing to sell!" "Our products make the profits"; "It is the life blood of our business"; and "We are a dp service bureau—that's the name of the game!"

The no responses: managers don't understand dp and don't want to understand, the unappreciated complain. They view management as "either computer illiterate or computer phobic"—distrustful, resentful, and fearful of the technology and the people who use it. They report sarcastically that management "has no earthly idea of what dp people do," "thinks that 'anyone with 10 days' training can perform the work,'" and "You push a button and bingo! it's done." Other managers are described contemptuously as treating dp as a car and programmers as auto mechanics.

These respondents say they are taken for granted, not treated as true professionals—never told "good job" but always reprimanded for mistakes. They are not regarded as partners of management, but almost as adversaries. Poor management in the form of indifference, lack of communication, and a bureaucratic and "speak only when spoken to" style were also cited. From non-dp-oriented industries come reports that dp is considered overhead, "a necessary evil," and somewhat "like a spare tire, i.e., we have a specific purpose, and when we're needed, we're needed. Otherwise, we tend to be excess baggage."

What You Should Know About Programmers

ties available? Overall, the survey revealed cautious optimism. While more are upbeat than are pessimistic—35% to 23%—a quarter of the respondents see no change, and 17% don't know or didn't answer.

Figure 5 shows how they answered by level of experience. The 20-year veterans are least unsure about the state of the job market. They've been there, know the market, and are the most negative: fully 30% perceive that there are fewer openings now.

The optimists in the sample see more widespread use of computers as the principal reason for their rosy picture of dp job availability. Optimists talk in terms of "exploding demand for applications development," and point to CAD/CAM, graphics, and spreadsheets as areas not widely available five years ago.

Why do others see their employment prospects as worse than five years ago? Mainly, they feel the pressures of a competitive job market. According to the pessimists, there is a glut of dp people. Those with minimal experience think the problem is a need for more experience, but seasoned professionals are feeling the crunch, too. Working professionals say the flood of entry-level people pouring out of school is reducing their opportunities. "New kids are cheaper," they say, and from all over the country come responses that indicate cost-conscious companies don't want to pay high premiums for experience; employers can train—and pay less to—a stream of well-educated, new college grads.

Pessimists also blame the sluggish economy in the nation and in their own areas. As evidence, they report seeing fewer recruitment ads in local newspapers.

Canned Software Dispiriting Trend

They also mention several other reasons they think the job market is not as good now. For one, the dp field is growing at a slower pace than it used to. Also, in a tight market, employers can be more selective, hiring better educated and more experienced people. The abundance of prepackaged or "canned" software is another dispiriting trend to the pessimists. "You can buy any program you want for \$100, instead of paying \$20,000 for a programmer," explains one respondent. Changes in computer technology and equipment and the need for candidates with specialties further erode job opportunities. Growing use of the new, such as pcs, and declining use of the old, i.e., 3GLs, is bad news for staffers

FIGURE 5 Number of Job Opportunities

(NOW VS. FIVE YEARS AGO)	YEARS OF EXPERIENCE						
	TOTAL (1751)	UNDER 2 (43)	2-5 (270)	6-9 (349)	10-14 (320)	15-19 (313)	20 OR MORE (437)
<i>No. of respondents in experience level = 100%</i>	%	%	%	%	%	%	%
<i>More opportunities now</i>	35	28	39	36	34	38	30
<i>Fewer opportunities now</i>	23	28	15	23	24	19	30
<i>About the same</i>	25	5	21	22	27	29	28
<i>Don't know/no answer</i>	17	39	25	19	15	14	12

How Did They Get Their Jobs?

Have programmers and analysts changed their job-hunting techniques since 1978?

Most frequently (32%), those surveyed applied directly. The more experience and tenure they had, the more likely they were to have done so. The older respondents (45 and above), in particular, went straight to the employer.

Seventeen percent went through employment agencies or search firms. The method was effective for those tenured five years or less, but not for mature professionals.

Sixteen percent responded to recruitment ads in newspapers or trade/professional journals. Women and young dp staffers relied heavily on advertising. In fact, for the "under-25s" it was the job-search method reported most often. Furthermore, recruitment advertising was used consistently by all age, experience, and tenure sectors except the highest tenure level.

Referral by a company employee (16%) or a business associate (11%) were other ways they gained entrée. The most senior respondents, 60 or older, used referrals more often than others.

Ten percent were recruited from college. The "under-30s" and those with little or no experience were more likely to have been recruited this way than their older, more experienced coworkers. Among Fortune 1000 respondents, 15% were recruited on campus, an indication that the recruitment efforts of these firms in the college market are productive.

Other methods were reported by 3%, including intracompany transfers, recruitment by the company, and civil service or other competitive government exams.

The modus operandi was the same eight years ago, but college recruiting and responding to recruitment advertising have increased since then, by 5% and 4% respectively.

with the "wrong" experience.

Optimistic or pessimistic, only 2% of the sample say they hope to leave the dp field within the next few years, but many are looking for some kind of change. The largest number, 39%, want to be managers, 26% specifically in dp or MIS. A reassuring 20% want to remain as professionals, 8% at just their current level. Retirement is the aim of 11%, 5% want to do consulting, and another 5% want to be self-employed, in dp or otherwise.

What can we conclude from this career research? A key point is that most dp professionals are still fascinated with their work. This and their generally reported satisfaction with salary seem to

compensate for day-to-day annoyances. Few want to leave the field.

A growing concern is with the lack of opportunities for advancement. Today's programmers and analysts feel acutely the crunch of too many staffers chasing too few promotions.

Although most see more job opportunities today at their level than five years ago, it is painfully evident that not all who have changed jobs to get ahead have achieved their goals. ■

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